

## Refinement of the AdEPT Medium-Energy Gamma-Ray Science

Completed Technology Project (2014 - 2015)



## Project Introduction

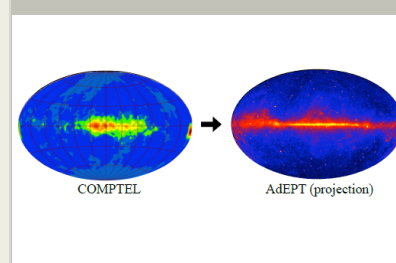
We propose to explore the theoretical framework for the relatively unexplored field of medium energy (5--200 MeV) gamma-ray astronomy for a mission concept emphasizing angular resolution and polarization sensitivity. Our goals are to refine the scientific goals for the development of the AdEPT telescope. Our investigation will enable continuing observations of the extremely energetic universe.

In support of the AdEPT mission concept, we will investigate the theoretical framework that provides the scientific motivation for MeV astronomy, including detecting gamma-ray polarization. Specifically, we will investigate astrophysical scenarios for which measurements by the AdEPT telescope will provide insight about physics under the extreme conditions found in many environments in the universe. Our effort will further provide a framework for evaluating and comparing the science returns of future MeV telescope concepts, especially AdEPT.

## Anticipated Benefits

In supporting the AdEPT mission concept and exploring medium-energy gamma-ray science, this project will provide synergy with *Fermi* and *Swift*, enhancing the science returns of these missions in addition to making new discoveries in the medium-energy gamma-ray band. AdEPT will also provide continuity with *Fermi*, maintaining observations of the extremely energetic universe.

The investigation will refine the science objectives of AdEPT that are crucial to its success. The investigation will also provide a framework for evaluating and comparing the science returns of future medium-energy gamma-ray telescope concepts.



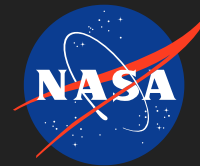
Gamma-Ray Science Project

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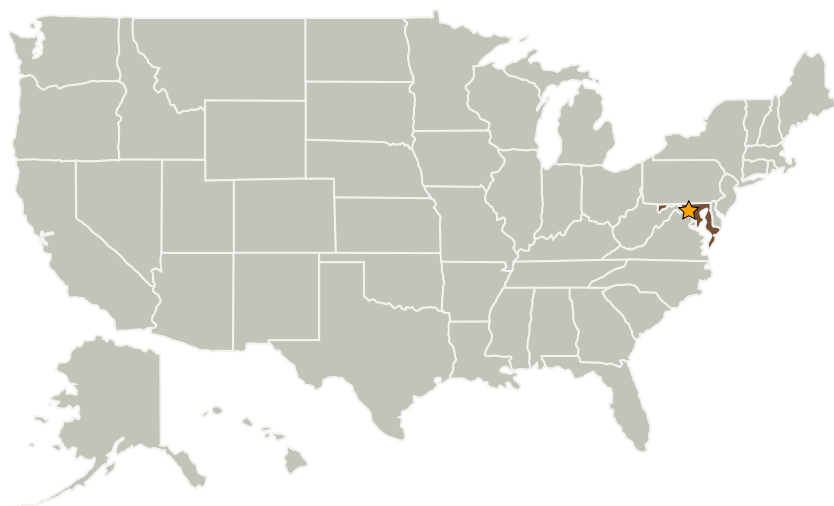
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### Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
★ Goddard Space Flight Center (GSFC)	Lead Organization	NASA Center	Greenbelt, Maryland

#### Primary U.S. Work Locations

Maryland

### Organizational Responsibility

#### Responsible Mission Directorate:

Mission Support Directorate (MSD)

#### Lead Center / Facility:

Goddard Space Flight Center (GSFC)

#### Responsible Program:

Center Independent Research & Development: GSFC IRAD

### Project Management

#### Program Manager:

Peter M Hughes

#### Project Manager:

Stanley D Hunter

#### Principal Investigator:

Tonia M Venters

#### Co-Investigators:

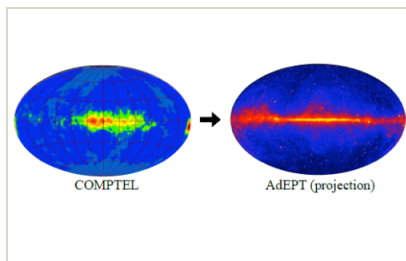
Stanley D Hunter  
Floyd W Stecker

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### Images



#### Gamma-Ray Science Project

Gamma-Ray Science Project  
(<https://techport.nasa.gov/image/16739>)

### Links

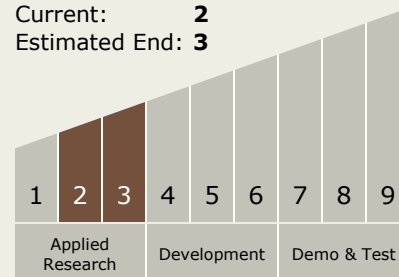
GSC-17507-1  
(no url provided)

#### Project Website:

<http://sciences.gsfc.nasa.gov/sed/>

### Technology Maturity (TRL)

Start: 2  
Current: 2  
Estimated End: 3



### Technology Areas

#### Primary:

- TX04 Robotic Systems
  - TX04.2 Mobility
    - TX04.2.1 Below-Surface Mobility